Sub A1

What is claimed is:

1. A zener zap diode device comprising

a p-doped region formed in a tub,

a n-doped region that is spaced from the p-doped region, thereby defining a p-n junction between the p-doped region and the tub or between the n-doped region and the tub depending on the doping of the tub,

and

a refractory metal silicide extending over part of at least the p-doped region, wherein the configuration of the device is such that the refractory metal silicide will form a silicide bridge across the p-n junction when a fusing current is established across the junction.

2. A device of Claim 1, further comprising a highly doped region in the tub which has the same polarity as the tub and extends partly between the p-doped and n-doped regions without shorting out the p-n junction.

3. A device of Claim 2, wherein the refractory metal silicide is Cobalt silicide.

Sub A2

4. A device of Claim 2, wherein the silicide bridge is formed to extend between the silicide on the p-doped region and silicide on the n-doped region or, if there is no silicide on the n-doped region, to a contact of the n-doped region.

5. A device of claim 2, wherein the p-doped region is formed by a p-doped polysilicon layer and the n-doped region is formed by a n-doped polysilicon layer, and the p-doped polysilicon layer and n-doped polysilicon layer are part of two different polysilicon layers in a multi-poly process.

6. A device of claim 2, wherein the p-doped region is formed by a p-doped polysilicon layer and the n-doped region is formed by a n-doped polysilicon layer, and the p-doped polysilicon layer and n-doped polysilicon layer are part of the same polysilicon layer in a multi-poly process.

Sub A3

7. A device of Claim 2, wherein the configuration of the device is such that the distance across which the bridge has to be formed is sufficiently short

and the resistance path across which the bridge has to be formed is sufficiently low so as to allow the fusing current to be sufficiently low to avoid undesirable damage to the device when the fusing current is established across the junction.

8. A device of claim 2, wherein the p-doped region is formed by a p-doped polysilicon layer and the n-doped region is formed by a n-doped polysilicon layer, and wherein said n-doped polysilicon layer and p-doped polysilicon layer are spaced from each other by at least a nitride spacer.

9. A zener zap diode device comprising

a p-doped region formed in a tub,

a n-doped region that is spaced from the p-doped region, thereby defining a p-n junction between the p-doped region and the tub or between the n-doped region and the tub depending on the doping of the tub,

a refractory metal silicide extending across the junction.

10. A zener zap diode device, comprising

a p-n junction between a p-type material and a n-type material,

a refractory metal silicide over at least the p-type material,

an electric contact to the refractory metal silicide over the p-type material,

an electric contact to the n-type material, and

a highly doped region of the same polarity as the p-type material or n-type material extends at least partially through the p-type or n-type material to provide a lower resistance current path without shorting out the p-n junction, wherein the configuration of the device is such that the refractory metal silicide will form a silicide bridge across the p-n junction when a fusing current is established across the junction.

11. A device of claim 10, wherein the electric contact to the n-type material contacts the n-type material through at least a refractory metal silicide.

12. A device of Claim 10, wherein the highly doped region is formed in a epitaxial region or sinker region which forms the n-type or p-type region.

Sub A4

13. A zener zap diode device, comprising

a first region of a first polarity in a tub of opposite polarity to define a p-n junction,

a second region with the same polarity as the tub, spaced from the first region, and

refractory metal silicide material in electrical contact with the first and second regions, wherein the configuration of the device is such that the refractory metal silicide will form a silicide bridge across the p-n junction when a fusing current is established across the junction.

14. A device of claim 13, further comprising a highly doped region of the same polarity as the tub extending partially between the first region and the second region without shorting out the p-n junction.

15. A device of Claim 13, wherein the tub is a epitaxial region or sink region.

16. A device of Claim 14, wherein the highly doped region extending partially between the first and second regions is formed by a first poly layer in a double poly process, and the first and second regions are formed by a second poly layer in a double poly process.

17. A device of Claim 14, wherein the first and second regions are formed by a first poly layer in a double poly process, and the highly doped region extending partially between the first and second regions is formed by a second poly layer in a double poly process.

18. A device of Claim 13, wherein the first and second regions are formed by two different poly layers in a double poly process.

Sub A5

19. A method of forming a zener zap diode device comprising

forming a first polysilicon layer on a n-type silicon material,

n-doping the first polysilicon layer,

forming a second polysilicon layer on the n-type silicon material to lie substantially on either side of the first layer,

n-doping a first portion of the second poly silicon layer,

p-doping a second portion of the second polysilicon layer,

depositing a refractory metal layer on at least the second polysilicon layer,

reacting the refractory metal with silicon of the second polysilicon layer to form a silicide, and

establishing a current between the first and second portions of the second polysilicon layer to establish a silicide bridge made from the refractory metal silicide to provide a low resistance path between contacts to the first and second portions, wherein the first and second polysilicon layers are formed in any order and the doping is performed at any stage that is appropriate in the process.

20. A method of Claim 19, wherein the refractory metal is Cobalt and the silicide bridge comprises a Cobalt silicide bridge.

21. A method of forming a zener zap diode device, comprising

forming a first polysilicon layer on a n-type silicon,

n-doping the first polysilicon layer,

forming a second polysilicon layer on the n-type silicon, spaced from the first polysilicon layer,

p-doping the second polysilicon layer,

depositing a refractory metal layer on at least part of the second polysilicon layer,

reacting the refractory metal with silicon to form a silicide, and

establishing a current between the first and second polysilicon layers to create a silicided bridge formed from the metal silicide to form a low resistance path between contacts to the first and second polysilicon layers, wherein the steps are performed in an order suitable for a double poly process.

Sub A6

22. A method of forming a zener zap diode device comprising

forming a first polysilicon layer on a p-type silicon material,

p-doping the first polysilicon layer,

forming a second polysilicon layer on the p-type silicon material to lie substantially on either side of the first layer,

n-doping a first portion of the second poly silicon layer,

p-doping a second portion of the second polysilicon layer,

depositing a refractory metal layer on at least the second polysilicon layer,

reacting the refractory metal with silicon of the second polysilicon layer to form a silicide, and

establishing a current between the first and second portions of the second polysilicon layer to establish a silicide bridge made from the refractory metal silicide to provide a low resistance path between contacts to the first and second portions, wherein the first and second polysilicon layers are formed in any order and the doping is performed at any stage that is appropriate in the process.

23. A method of Claim 22, wherein the refractory metal is Cobalt and the silicide bridge comprises a Cobalt silicide bridge.

24. A method of forming a zener zap diode device, comprising

forming a first polysilicon layer on a p-type silicon,

p-doping the first polysilicon layer,

forming a second polysilicon layer on the p-type silicon, spaced from the first polysilicon layer,

n-doping the second polysilicon layer,

depositing a refractory metal layer on at least part of the first polysilicon layer,

reacting the refractory metal with silicon to form a silicide, and

establishing a current between the first and second polysilicon layers to create a silicided bridge formed from the metal silicide to form a low resistance path between contacts to the first and second polysilicon layers, wherein the steps are performed in an order suitable for a double poly process.

Sub 7
A7